

CLAIMS

What is claimed is:

1. A collector apparatus adapted for handling flat and letter units, the apparatus comprising:
  - 5 (a) a first staging area comprising a first staging surface and a first stage transport assembly;
  - (b) a second staging area generally disposed downstream from the first staging area, the second staging area comprising a second staging surface and a second stage transport assembly;
  - 10 (c) a third staging area comprising at least a portion of the second stage transport assembly; and
  - (d) a conveying device adjustable between a flats mode position and a letters mode position, wherein:
    - 15 (i) in the letters mode position, a first material flow path is defined through the first and second staging areas; and
    - (ii) in the flats mode position, a second material flow path is defined through the third staging area.
2. The apparatus according to claim 1 wherein the first stage transport  
20 assembly comprises a movable first endless member.
3. The apparatus according to claim 2 wherein the first stage transport assembly includes a pusher element attached to the first endless member.

4. The apparatus according to claim 3 wherein the first stage transport assembly includes a registration element attached to the first endless member.

5 5. The apparatus according to claim 2 wherein the first stage transport assembly includes a registration element attached to the first endless member.

10 6. The apparatus according to claim 2 wherein the second stage transport assembly comprises a second endless member.

15 7. The apparatus according to claim 6 wherein the first stage transport assembly rotates around a plurality of first rotatable elements, the second stage transport assembly rotates around a plurality of second rotatable elements, and at least one of the first rotatable elements and at least one of the second rotatable elements share a common axis of rotation.

20 8. The apparatus according to claim 6 wherein the second stage transport assembly includes a pusher element attached to the second endless member.

25 9. The apparatus according to claim 8 wherein the second stage transport assembly includes a registration element attached to the second endless member.

10. The apparatus according to claim 6 wherein the second stage transport assembly includes a registration element attached to the second endless member.

5 11. The apparatus according to claim 1 wherein the third staging area comprises the second staging surface and at least a portion of the first staging surface.

10 12. The apparatus according to claim 1 wherein the third staging area comprises a registration element movable by the second stage transport assembly.

15 13. The apparatus according to claim 12 wherein the third staging device comprises a pusher element movable by the first stage transport assembly.

20 14. The apparatus according to claim 13 wherein the third staging device comprises a pusher element movable by the second stage transport assembly.

25 15. The apparatus according to claim 12 wherein the third staging device comprises a pusher element movable by the second stage transport assembly.

16. The apparatus according to claim 1 wherein the conveying device comprises a retractable first conveying assembly, the retractable first conveying assembly is extended over at least a portion of the first staging surface in the flats mode position of the conveying device, and the retractable first conveying assembly is retracted to expose the first staging surface in the letters mode position.
17. The apparatus according to claim 16 wherein the retractable first conveying assembly comprises a movable first endless belt, the movable endless belt is extended over at least a portion of the first staging surface in the flats mode position of the conveying device, and the movable first endless belt is retracted to expose the first staging surface in the letters mode position.
18. The apparatus according to claim 17 comprising an input device operatively communicating with an upstream end region of the first staging area in the letters mode position, and operatively communicating with an upstream end region of the third staging area through the conveying device in the flats mode position.
19. The apparatus according to claim 16 wherein the retractable first conveying assembly comprises a first rotatable element, the first rotatable element disposed at an upstream end region of the first staging area in the letters mode position, and alternatively disposed at a downstream end region of the first staging area in the flats mode position.

20. The apparatus according to claim 19 wherein the retractable first conveying assembly comprises a first endless belt movable about the first rotatable element.

5 21. The apparatus according to claim 19 wherein the retractable first conveying assembly comprises a second rotatable element disposed at first elevation in the letters mode position, and alternatively disposed at a second elevation in the flats mode position, and wherein the second elevation is higher than the first elevation.

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22. The apparatus according to claim 21 wherein the retractable first conveying assembly comprises a first endless belt movable about the first and second rotatable elements.

15 23. The apparatus according to claim 21 wherein the second rotatable element is biased toward the second elevation by a biasing component.

24. The apparatus according to claim 23 wherein the biasing component includes a constant-force spring.

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25 25. The apparatus according to claim 16 wherein the conveying device comprises a second conveying assembly, the first conveying assembly includes a movable first endless belt, the second conveying assembly includes a movable second endless belt, and the second material flow path runs between the first and second endless belts.

26. The apparatus according to claim 25 comprising an input device operatively communicating with an upstream end region of the first staging area in the letters mode position, and operatively communicating with an upstream end region of the third staging area through the first and second endless belts in the flats mode position.

27. The apparatus according to claim 16 wherein the conveying device comprises a material unit guiding component adjustable between the flats mode position and the letters mode position, and wherein, in the letters mode position, the guiding component is disposed at a first elevation at which the guiding component is adapted to at least partially define the first material flow path, and in the flats mode position, the guiding component is disposed at a second elevation higher than the first elevation.

28. The apparatus according to claim 1 wherein the conveying device comprises a material unit guiding component adjustable between the flats mode position and the letters mode position, and wherein, in the letters mode position, the guiding component is disposed at a first elevation at which the guiding component is adapted to at least partially define the first material flow path, and in the flats mode position, the guiding component is disposed at a second elevation higher than the first elevation.

29. The apparatus according to claim 1 comprising an input device  
operatively communicating with an upstream end region of the first  
staging area in the letters mode position, and operatively communicating  
with an upstream end region of the third staging area through the  
conveying device in the flats mode position.

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30. The apparatus according to claim 29 wherein the input device includes an  
axis of rotation in common with an output device of a folder apparatus.

10 31. The apparatus according to claim 29 wherein the input device is  
supported by an upstream material unit processing device.

32. The apparatus according to claim 29 comprising an output device  
operatively communicating with a downstream end of the second staging  
area.

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33. The apparatus according to claim 1 comprising an output device  
operatively communicating with a downstream end of the second staging  
area.

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34. A material unit collector apparatus adapted for alternately handling flat  
and letter units, the apparatus comprising:

- (a) a first staging area comprising a first staging surface and a first  
stage transport assembly;

- (b) a second staging area generally disposed downstream from the first staging area, the second staging area comprising a second staging surface and a second stage transport assembly; and
- (c) an adjustable transport assembly comprising a lower transport subassembly adjustable between a flats mode position and a letters mode position, the lower transport subassembly including a lower conveying element operatively engaging a front rotatable element and a rear rotatable element, wherein the front rotatable element is disposed above the first staging surface and is generally horizontally adjustable between the flats mode and letters mode positions, and the rear rotatable element is disposed below the first staging surface and is generally vertically adjustable between the flats mode and letters mode positions.

35. The apparatus according to claim 34 wherein the first stage transport assembly comprises a first endless conveying device.

36. The apparatus according to claim 35 wherein the first stage transport assembly comprises a pusher element attached to the first endless conveying device.

37. The apparatus according to claim 36 wherein the first stage transport assembly comprises a registration element attached to the first endless conveying device.



38. The apparatus according to claim 35 wherein the second stage transport assembly comprises a second endless conveying device.

5 39. The apparatus according to claim 38 wherein the first stage transport assembly rotates around a plurality of first rotatable elements, the second stage transport assembly rotates around a plurality of second rotatable elements, and at least one of the first rotatable elements and at least one of the second rotatable elements share a common axis of rotation.

10 40. The apparatus according to claim 34 comprising an input device operatively communicating with an upstream end region of the first staging area at the letters mode position, and operatively communicating with an intermediate region downstream from the upstream end region through the adjustable transport assembly at the flats mode position.

15 41. The apparatus according to claim 34 wherein the adjustable transport assembly comprises an upper transport subassembly including an upper conveying element disposed above the lower conveying element.

20 42. The apparatus according to claim 41 comprising an input device operatively communicating with an upstream end region of the first staging area in the letters mode position, and operatively communicating with an intermediate region downstream from the upstream end region through the upper and lower conveying elements in the flats mode position.  
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43. The apparatus according to claim 34 wherein the adjustable transport assembly comprises a material unit guiding component adjustable between the flats mode position and the letters mode position, and wherein, the guiding component is disposed at a first elevation in the letters mode position and is disposed at a second elevation higher than the first elevation in the flats mode position.
44. The apparatus according to claim 34 comprising an input device operatively communicating with an upstream end region of the first staging area in the letters mode position, and operatively communicating with an intermediate region downstream from the upstream end region through the conveying device in the flats mode position.
45. The apparatus according to claim 44 comprising an output device operatively communicating with a downstream end of the second staging area.
46. The apparatus according to claim 34 comprising an output device operatively communicating with a downstream end of the second staging area.
47. A material unit handling system comprising:
- (a) an upstream material unit processing device; and
  - (b) a material unit collector apparatus comprising:

(i) a staging area including an upstream region and a downstream region;

(ii) a conveying device adjustable between a flats mode position and a letters mode position, wherein:

5 in the letters mode position, the conveying device provides a first material flow path running from the upstream material unit processing device and into the upstream region of the staging area; and

10 in the flats mode position, the conveying device provides a second material flow path running from the upstream material unit processing device and into the downstream region of the staging area.

48. The system according to claim 47 wherein the upstream region of the staging area includes a first stage transport assembly and the downstream region of the staging area includes a second stage transport assembly.

49. The system according to claim 47 wherein the conveying device comprises a retractable conveying assembly, the retractable conveying assembly is extended over at least a portion of the upstream region of the staging area in the flats mode position of the conveying device, and the retractable conveying assembly is retracted to expose the upstream region of the staging area in the letters mode position.

50. The system according to claim 47 comprising a downstream material unit processing device communicating with the first material flow path in the letters mode position, and alternatively communicating with the second material flow path in the flats mode position.

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51. A method for converting a collector apparatus between a letters mode of operation and a flats mode of operation, comprising the steps of:

(a) providing a collector apparatus comprising a first staging area, a second staging area generally disposed downstream from the first staging area, a third staging area comprising at least a portion of the second staging area, and an adjustable conveying element; and

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(b) moving the adjustable conveying element between a letters mode position and a flats mode position, wherein the letters mode position causes sheet articles to operatively flow into the first staging area, and the flats mode position causes sheet articles to operatively flow into the third staging area.

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52. The method according to claim 51 wherein the step of moving the adjustable conveying element includes setting the adjustable conveying element to the letters mode position by retracting a rotatable member and an endless member rotatable about the rotatable member to enable sheet articles to be transported across a first staging surface of the first staging area.

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53. The method according to claim 51 wherein the step of moving the adjustable conveying element includes setting the adjustable conveying element to the letters mode position by lowering a rotatable member to a lower position and retracting an endless member rotatable about the rotatable member to enable sheet articles to be transported across a first staging surface of the first staging area.

54. The method according to claim 51 wherein the step of moving the adjustable conveying element includes setting the adjustable conveying element to the letters mode position by lowering a first rotatable member to a lower position, moving a second rotatable member to an upstream region of the first staging area, and retracting an endless member rotatable about the first and second rotatable members to enable sheet articles to be transported across a first staging surface of the first staging area.

55. The method according to claim 51 wherein the step of moving the adjustable conveying element includes setting the adjustable conveying element to the flats mode position by extending a rotatable member and an endless member rotatable about the rotatable member over at least a portion of the first staging area.

56. The method according to claim 51 wherein the step of moving the adjustable conveying element includes setting the adjustable conveying element to the flats mode position by raising a rotatable member to an

upper position and extending an endless member rotatable about the rotatable member over at least a portion of the first staging area.

57. The method according to claim 51 wherein the step of moving the  
5 adjustable conveying element includes setting the adjustable conveying  
element to the flats mode position by raising a first rotatable member to  
an upper position, moving a second rotatable member to a downstream  
region of the first staging area, and extending an endless member  
rotatable about the first and second rotatable members over at least a  
10 portion of the first staging area.

58. The method according to claim 51 wherein the step of moving the  
adjustable conveying element includes the alternate steps of:  
(a) extending a rotatable member and an endless member rotatable  
15 about the rotatable member over at least a portion of the first  
staging area; and  
(b) retracting the rotatable member and the endless member to  
enable sheet articles to be transported across the first staging  
surface.

59. The method according to claim 51 wherein the step of moving the  
adjustable conveying element includes the alternate steps of:  
(a) raising a rotatable member to an upper position and extending an  
endless member rotatable about the rotatable member over at  
20 least a portion of the first staging area; and  
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- (b) lowering the rotatable member to a lower position and retracting the endless member to enable sheet articles to be transported across the first staging surface.

5 60. The method according to claim 51 wherein the step of moving the adjustable conveying element includes the alternate steps of:

- 10 (a) raising a first rotatable member to an upper position, moving a second rotatable member to a downstream region of the first staging area, and extending an endless member rotatable about the first and second rotatable members over at least a portion of the first staging area; and
- (b) lowering the first rotatable member to a lower position, moving the second rotatable member to an upstream region of the first staging area, and retracting the endless member to enable sheet articles  
15 to be transported across the first staging surface.

61. A method for transporting letter units and/or one or more stacks of letter units through a collector apparatus, comprising the steps of:
- 20 (a) providing a collector apparatus comprising a first staging area, a first stage transport assembly operative within the first staging area, a second staging area generally disposed downstream from the first staging area, a second stage transport assembly operative within the second staging area, a third staging area comprising at least a portion of the second stage transport assembly, and an  
25 adjustable conveying element;

- (b) setting the adjustable conveying element to a position at which the first stage transport assembly can operatively engage letter units;
- (c) causing a letter unit to enter the first staging area and become engaged with the first stage transport assembly; and
- 5 (d) causing the first stage transport assembly to transport the letter unit into the second staging area and become engaged with the second stage transport assembly.

62. The method according to claim 61 wherein the step of setting the  
10 adjustable conveying element includes the step of retracting a rotatable member and an endless member rotatable about the rotatable member to expose the first staging area.

63. The method according to claim 61 wherein the step of setting the  
15 adjustable conveying element includes the steps of lowering a rotatable member and retracting an endless member rotatable about the rotatable member to expose the first staging area.

64. The method according to claim 61 wherein the step of setting the  
20 adjustable conveying element includes the steps of lowering a first rotatable member, moving a second rotatable member to an upstream region of the first staging area, and retracting an endless member rotatable about the first and second rotatable members to expose the first staging area.



65. The method according to claim 61 wherein the step of causing the letter unit to become engaged with the first stage transport assembly includes the step of bringing the letter unit into front end registration with a registration element.

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66. The method according to claim 65 wherein the registration element is moved by the first stage transport assembly.

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67. The method according to claim 61 wherein the step of causing the first stage transport assembly to transport the letter unit into the second staging area includes the step of using a pusher element of the first stage transport assembly to move the letter unit toward the second staging area.

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68. The method according to claim 61 wherein the step of causing the letter unit to become engaged with the second stage transport assembly includes the step of bringing the letter unit into front end registration with a registration element.

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69. The method according to claim 68 wherein the registration element is moved by the second stage transport assembly.

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70. The method according to claim 61 comprising the step of causing a plurality of letter units to enter the first staging area and become collected as a stack.

71. The method according to claim 70 comprising the step of using the first stage transport assembly to transport the stack into the second staging area.

5 72. The method according to claim 61 comprising the step of holding a stack of letter units in the second staging area while other letter units are entering the first staging area.

10 73. A method for transporting flat units and/or one or more stacks of flat units through a collector apparatus, comprising the steps of:

(a) providing a collector apparatus comprising a first staging area, a first stage transport assembly operative within the first staging area, a second staging area generally disposed downstream from the first staging area, a second stage transport assembly operative within the second staging area, a third staging area comprising at least a portion of the second stage transport assembly, and an adjustable conveying element;

(b) causing the adjustable conveying element to transport a flat unit into the third staging area; and

20 (c) causing the flat unit to become engaged with the second stage transport assembly.

74. The method according to claim 73 comprising the step of setting the adjustable conveying element by extending a rotatable member and an

endless member rotatable about the rotatable member over at least a portion of the first staging area.

5 75. The method according to claim 73 comprising the step of setting the adjustable conveying element by raising a rotatable member, and extending an endless member rotatable about the rotatable member over at least a portion of the first staging area.

10 76. The method according to claim 73 comprising the step of setting the adjustable conveying element by raising a first rotatable member, moving a second rotatable member over at least a portion of the first staging area, and extending an endless member rotatable about the first and second rotatable members over at least a portion of the first staging area.